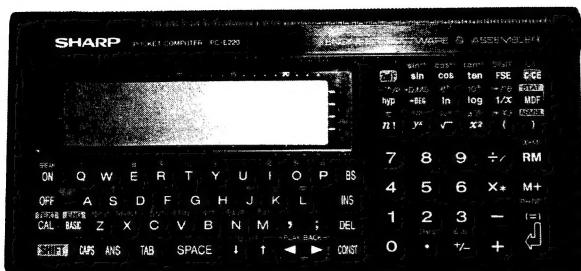


SHARP SERVICE MANUAL

CODE: 00ZPCE220SM/E



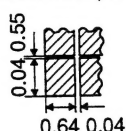
MODEL PC-E220

1. General

The PC-E220 is equipped with the Z80 CPU, 32KB RAM (with memory backup function), and Z80 machine language monitor.

2. Specifications

| | |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model: | PC-E220 |
| Calculation digits: | 10 digits + 2 digits |
| Calculation system: | Formula order (Priority judgment function) |
| Program language: | BASIC, ASSEMBLER |
| CPU: | CMOS Z80A (8 bit) |
| RAM: | 32KB (system area approx. 2.1KB, program/data area 30435B, data area 208B), with RAM file function. |
| Stack: | Subroutine stack: 10 buffers Function stack: 16 buffers FOR-NEXT stack: 5 buffers Data stack: 8 buffers |
| Editing functions: | Cursor shift (right/left) (▶, ◀), insertion (INS), delete (DEL), List up, list down (↑, ↓), back space (BS), text editor, Z80 machine language monitor |
| Interface: | 11 pin interface (for cassette interface, printer, SIO device) |
| Display: | 5 x 7 dot matrix LCD (24 digits x 4 lines) |



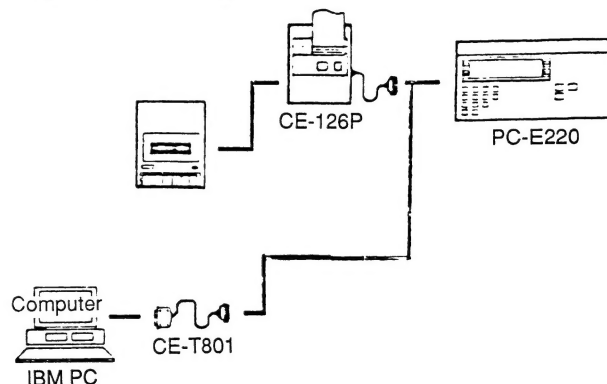
| | |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memory protection: | Battery backup |
| Operating temperature: | 0°C ~ 40°C (32° ~ 104°F) |
| Power supply: | For computer operation: 6.0 Vdc Type-AA dry cell battery (R06) x 4 For memory backup: 3.0 Vdc Lithium battery (CR2032) x 1 |
| Battery lifetime: | Approximately 80 hours of continuous operation under normal conditions (based on 10 minutes of operation or program execution and 50 minutes of display per hour at a temperature of 20°C/68°F). Note: When the computer is used for serial communications through the optional CE-T801 Data Transfer Cable, the number of hours the unit can be operated continuously will drop to approx. 48 hours (when used for 2 min. of communications, 8 min. of calculation or program execution, and 50 min. of display per hour at an ambient temperature |

of 20°C/68°F).

The operating time may vary slightly depending on usage and the brand of battery used.

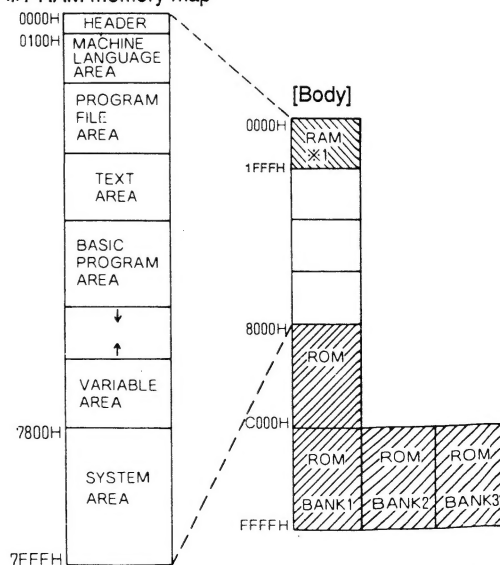
| | |
|----------------------|-----------------------------------------------------------------------------|
| Power consumption: | 0.37W |
| External dimensions: | 215mm(W) x 100mm (D) x 18mm (H) 8 15/32" (W) x 3 15/16" (D) x 23/32" (H) |
| Weight: | 280g (0.62 lb.) (Including the battery, without hard case) |
| Accessories: | Hard cover, four AA batteries, one lithium battery, and Operation manual |

3. System configuration



4. Memory map

*1 RAM memory map



This document has been published to be used for after sales service only.
The contents are subject to change without notice.

SHARP CORPORATION

5. I/O map

| | |
|-----|-------------|
| 00H | RESERVED |
| 10H | FOR SYSTEM |
| 20H | FREE |
| 30H | FREE |
| 40H | FOR DISPLAY |
| 50H | FOR DISPLAY |
| 60H | RESERVED |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| FFH | |

| Name | Function | Pin function | Bit map | READ | WRITE | ADDRESS |
|---------------------------|-------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|---------|
| IA1-IA8 | KEY common input | IN (Including a pull-down resistor) | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div>8</div><div>7</div><div>6</div><div>5</div><div>4</div><div>3</div><div>2</div><div>1</div> </div> | ○ | × | 10H |
| KO1-KO8 | KEY strobe | OUT (Pch open drain) | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div>8</div><div>7</div><div>6</div><div>5</div><div>4</div><div>3</div><div>2</div><div>1</div> </div> <div>KO</div> | × | ○ | 11H |
| KO9, KO10 | KEY strobe | OUT (Pch open drain) | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>KO</div> <div>KO</div> <div>10</div> <div>9</div> | × | ○ | 12H |
| SFTIN | SHIFT key input | IN (Including a pull down resistor) | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>SFT</div> | ○ | × | 13H |
| Timer | 1S signal is set about every 0.6 sec. | — | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>1S</div> | ○ | ○ | 14H |
| XIN control | Controls on/off of XIN input. | IN | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div>XIN ON/OFF</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> | ○ | ○ | 15H |
| Maskable interrupt factor | Indicates interrupt generating factor with the interrupt mask ON. | — | <div> <div>MSB</div> <div> <div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div>LSB</div> </div> <div> <div></div><div></div><div></div><div></div><div>INT1</div><div>1S</div><div>KON</div><div>IA</div> </div> | ○ | ○ | 16H |

0: XIN input inhibit
1: XIN input enable

Conditions for becoming "1":
When IA-IA key input signal is supplied.
When KON-KON key input is supplied.
1S-0.6 sec timer signal is supplied.
A low pulse is supplied to INT1-INT1 input pin.
To reset each factor, write "1." With 0FH → OUT (16H), all factors become 0.

| Name | Function | Pin function | Bit map | READ | WRITE | ADDRESS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|---------|-----|------------|-----------|------|------|------|------|------|------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----------------------------------|---|---|---|---|---|-------|---|---|-------|---|---|-------|------|------|------|----------------------------------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|-----|
| Interrupt mask | Performs interrupt enable/inhibit of each interrupt factor. | — | <div>MSB<div><div></div><div></div><div></div><div></div><div>INT1</div><div>1S</div><div>KON</div><div>IA</div></div><div>LSB</div></div> <div>0: Interruption inhibit 1: Interruption enable</div> | ○ | ○ | 17H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FO1, FO2, XOUT | 11 pin interface output control port | OUT FO1, FO2 (Pch open drain) | <div>MSB<div><div>X</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>FO</div><div>FO</div></div><div>LSB</div></div> <div>OUT<div><div></div><div>2</div><div>1</div></div></div> <div>0: Low output 1: High output</div> | ○ | ○ | 18H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK0 BNK1 BNK2 | <div>When making access to C000H ~ FFFFH</div> <div><table><tr><td>Output pin</td><td>Input pin</td></tr><tr><td>BNK0</td><td>BK0</td></tr><tr><td>BNK1</td><td>BK1</td></tr></table></div> <div>CEROM1 signal is supplied (Active low)</div> <div>When making access to 8000H ~ BFFFH</div> <div><table><tr><td>Output pin</td><td>Input pin</td></tr><tr><td>BNK0</td><td>BK'0</td></tr><tr><td>BNK1</td><td>BK'1</td></tr><tr><td>BNK2</td><td>BK'2</td></tr></table></div> <div>CEROM2 signal is supplied. (Active Low)</div> | Output pin | Input pin | BNK0 | BK0 | BNK1 | BK1 | Output pin | Input pin | BNK0 | BK'0 | BNK1 | BK'1 | BNK2 | BK'2 | OUT | <div>MSB<div><div></div><div>BK'</div><div>BK'</div><div>BK'</div><div></div><div></div><div>BK</div><div>BK</div></div><div>LSB</div></div> <div><div><div>2</div><div>1</div><div>0</div></div><div><div>1</div><div>0</div></div></div> <div><ul style="list-style-type: none">Supplied to BNK0 and BNK1 pins when making access to BK0, BK1 system ROM bank port C000H ~ FFFFH.</div> <div><table><tr><th>BK1</th><th>BK0</th><th>C000H ~ FFFFH bank specification</th></tr><tr><td>0</td><td>0</td><td>—</td></tr><tr><td>0</td><td>1</td><td>BANK1</td></tr><tr><td>1</td><td>0</td><td>BANK2</td></tr><tr><td>1</td><td>1</td><td>BANK3</td></tr></table></div> <div><ul style="list-style-type: none">Supplied to BNK2, BNK1, and BNK0 pins when making access to BK'2=BK'0 (expansion back port) 8000H ~ BFFFH.</div> <div><table><tr><th>BK'2</th><th>BK'1</th><th>BK'0</th><th>8000H ~ BFFFH bank specification</th></tr><tr><td>1</td><td>0</td><td>0</td><td>EXBANK0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>EXBANK1</td></tr><tr><td>1</td><td>1</td><td>0</td><td>EXBANK2</td></tr><tr><td>1</td><td>1</td><td>1</td><td>EXBANK3</td></tr></table></div> <div>By driving BK'2 to "1," the system ROM 8000H ~ BFFFH is separated.</div> | BK1 | BK0 | C000H ~ FFFFH bank specification | 0 | 0 | — | 0 | 1 | BANK1 | 1 | 0 | BANK2 | 1 | 1 | BANK3 | BK'2 | BK'1 | BK'0 | 8000H ~ BFFFH bank specification | 1 | 0 | 0 | EXBANK0 | 1 | 0 | 1 | EXBANK1 | 1 | 1 | 0 | EXBANK2 | 1 | 1 | 1 | EXBANK3 | ○ | ○ | 19H |
| Output pin | Input pin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK0 | BK0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK1 | BK1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output pin | Input pin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK0 | BK'0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK1 | BK'1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BNK2 | BK'2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BK1 | BK0 | C000H ~ FFFFH bank specification | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | — | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | BANK1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | BANK2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | BANK3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BK'2 | BK'1 | BK'0 | 8000H ~ BFFFH bank specification | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | EXBANK0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 1 | EXBANK1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 0 | EXBANK2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | EXBANK3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CERAM1 CERAM2 | Chip enable signal supplied when making access to 0000H ~ 7FFFFH (Active high) | OUT | <div>MSB<div><div></div><div></div><div></div><div></div><div></div><div></div><div>SLOT</div><div></div></div><div>LSB</div></div> <div>SLOT=0: CERAM1 is effective. SLOT=1: CERAM2 is effective.</div> | ○ | ○ | 1BH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IORESET | Expansion peripheral RESET | OUT | <div>MSB<div><div></div><div></div><div></div><div></div><div></div><div></div><div>IOR</div><div>X</div></div><div>LSB</div></div> <div>"0" must be written into this bit.</div> <div><table><tr><th>IOR</th><th>IORESET</th></tr><tr><td>0</td><td>Low</td></tr><tr><td>1</td><td>High</td></tr></table></div> <div><ul style="list-style-type: none">When the set power source is turned on and when the reset key is pressed, a high pulse is supplied to IORESET.</div> | IOR | IORESET | 0 | Low | 1 | High | × | ○ | 1CH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOR | IORESET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Low | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | High | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IB1, IB2 XIN | 11 pin interface input port (IB1 and IB2 are equipped with pull down resistor.) | IN | <div>MSB<div><div>KON</div><div></div><div></div><div></div><div></div><div></div><div>XIN</div><div>IB</div><div>IB</div></div><div>LSB</div></div> <div><div><div></div><div>2</div><div>1</div></div></div> <div>XIN input is enable when XIN control port is at "1."</div> | ○ | × | 1FH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KON | ON Break key input | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6. LSI descriptions

CPU (LZ8413M) pin signal descriptions

| Pin No. | I/O | Signal name | Description |
|---------|-----|-------------|-------------------------------------------------------------------------------|
| 1 | O | KO2 | Key strobe |
| 2 | O | KO3 | Key strobe |
| 3 | O | KO4 | Key strobe |
| 4 | O | KO5 | Key strobe |
| 5 | O | KO6 | Key strobe |
| 6 | O | KO7 | Key strobe |
| 7 | O | KO8 | Key strobe |
| 8 | O | KO9 | Key strobe |
| 9 | O | KO10 | Key strobe |
| 10 | I | IA1 | Key input |
| 11 | I | IA2 | Key input |
| 12 | I | IA3 | Key input |
| 13 | I | IA4 | Key input |
| 14 | I | IA5 | Key input |
| 15 | I | IA6 | Key input |
| 16 | I | IA7 | Key input |
| 17 | I | IA8 | Key input |
| 18 | I/O | MREQ | Z80CPU memory request signal |
| 19 | I/O | IORQ | Z80CPU I/O request signal |
| 20 | I | BUSRQ | Z80CPU bus request signal |
| 21 | O | IORESET | Expansion peripheral reset output (Active high) (40 pin expansion bus output) |
| 22 | I | WAIT | Z80CPU wait input |
| 23 | I | INT1 | Z80CPU maskable interrupt request |
| 24 | I/O | WR | Z80CPU memory write signal |
| 25 | I/O | RD | Z80CPU memory read signal |
| 26 | I/O | BNK3 | Bank select address (When resetting, domestic/foreign select signal) |
| 27 | I/O | BNK2 | Bank select address |
| 28 | O | BNK1 | Bank select address |
| 29 | O | BNK0 | Bank select address |
| 30 | O | CEROM2 | Expansion memory chip enable signal (Outputted to 40 pin expansion bus) |
| 31 | O | CEROM1 | Built-in system ROM chip enable signal |
| 32 | — | GND | Reference voltage |
| 33 | O | CERAM2 | Expansion memory chip enable signal (Outputs to 40 pin expansion bus.) |
| 34 | O | CERAM1 | Built-in RAM chip enable signal |
| 35 | I | IB2 | 11 pin ACK |
| 36 | I | IB1 | 11 pin DIN |
| 37 | O | XOUT | Cassette signal output |
| 38 | I | XIN | Cassette signal input |
| 39 | O | FO2 | 11 pin DOUT |
| 40 | O | FO1 | 11 pin BUSY |
| 41 | I/O | D7 | Data bus |
| 42 | I/O | D6 | Data bus |
| 43 | I/O | D5 | Data bus |
| 44 | I/O | D4 | Data bus |
| 45 | I/O | D3 | Data bus |

| Pin No. | I/O | Signal name | Description |
|---------|-----|-------------|---------------------------------------------------------------------------------------------------|
| 46 | I/O | D2 | Data bus |
| 47 | I/O | D1 | Data bus |
| 48 | I/O | D0 | Data bus |
| 49 | I/O | A15 | Address bus |
| 50 | I/O | A14 | Address bus |
| 51 | O | A13 | Address bus |
| 52 | O | A12 | Address bus |
| 53 | O | A11 | Address bus |
| 54 | I/O | A10 | Address bus |
| 55 | O | A9 | Address bus |
| 56 | O | A8 | Address bus |
| 57 | I/O | A7 | Address bus |
| 58 | I/O | A6 | Address bus |
| 59 | I/O | A5 | Address bus |
| 60 | I/O | A4 | Address bus |
| 61 | I/O | A3 | Address bus |
| 62 | I/O | A2 | Address bus |
| 63 | I/O | A1 | Address bus |
| 64 | I/O | A0 | Address bus |
| 65 | I | RESET | Reset input (Reset at LOW) |
| 66 | O | E | Liquid crystal driver enable signal |
| 67 | I | M | Timer clock input |
| 68 | I | LB | Low battery detection pin. Low when low battery. |
| 69 | O | CAU | Low battery symbol lighting voltage detection pin. (After turning on the symbol, high impedance.) |
| 70 | I | XTAL1 | Oscillation circuit input |
| 71 | O | XTAL2 | Oscillation circuit output |
| 72 | — | GND | Power source ⊖ |
| 73 | O | CLKOUT | Oscillation clock output |
| 74 | — | VCC | Power source ⊕ |
| 75 | O | VCNT | Liquid crystal power ON/OFF SW signal |
| 76 | O | BZ | BUZZER |
| 77 | I/O | M1 | Z80CPU machine cycle |
| 78 | I | KON | CN KEY input |
| 79 | I | SFTIN | SHIFT KEY input |
| 80 | O | KO1 | Key strobe |

7. Low battery detection circuit

This unit is equipped with the low battery detection circuit. Its operations are described below. (The parts location numbers are different from the actual ones.)

As shown below, when the input voltage VIN exceeds detection voltage VD, the output becomes HIGH from LOW. When VIN falls below VD, the output becomes LOW.

The LBIC (MN1280) detects the CAU level and the STOP level with one IC.

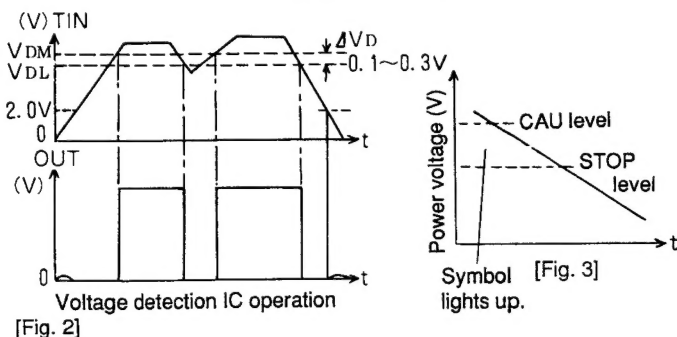
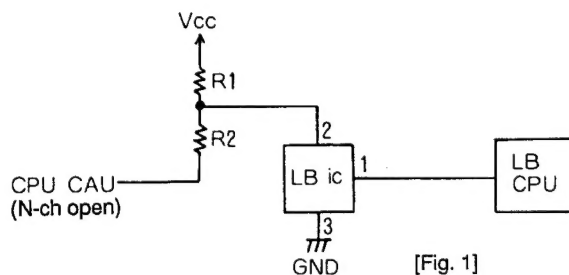
To achieve this, the input voltage applied to the input pin (2 pin) is divided with R1 and R2, and R2 is turned on/off by the CAU signal.

As shown in Fig. 3, when the power voltage falls below the CAU level, the BATT symbol lights up. When it falls further below the STOP level, it is turned off.

To detect the CAU level, the CPU CAU pin is turned on (at low level) and the LB pin of the CPU is checked. (If the LBC pin is low, the symbol lights up.)

After detecting the CAU level, the CAU pin is turned off (at HIGH.) (When the CAU pin is turned off, the resistor division is not performed and the potential at BIC 2 pin rises to drive the output to HIGH.) Then the CPU LB pin is checked again to detect the STOP level.

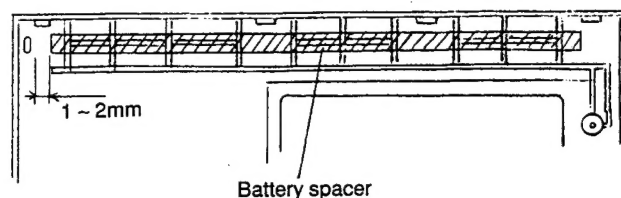
After detecting the STOP level, the ON/BRK key and the RESET switch do not work.



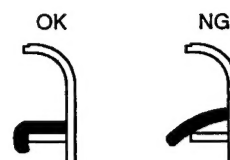
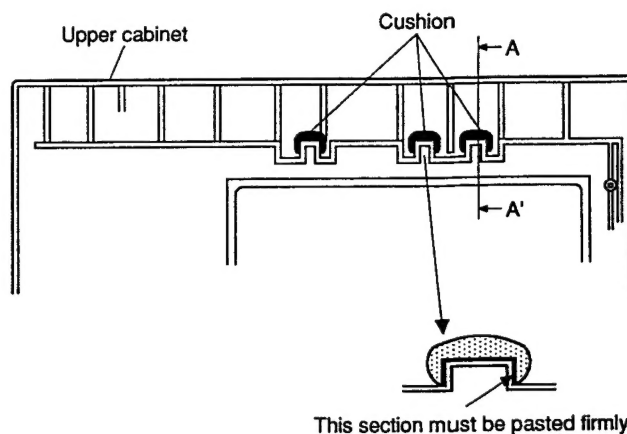
8. Note for servicing

1. Cabinet upper unit

○ Battery spacer attachment



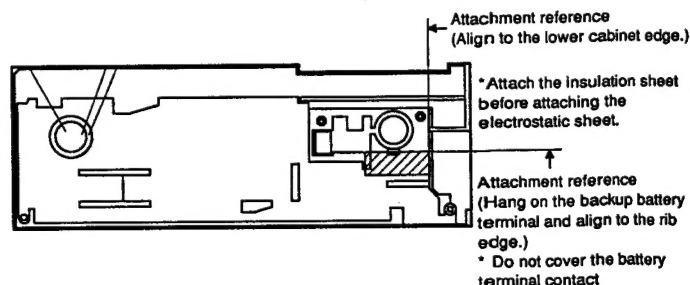
2. Battery holder cushion attachment



A-A' cross section

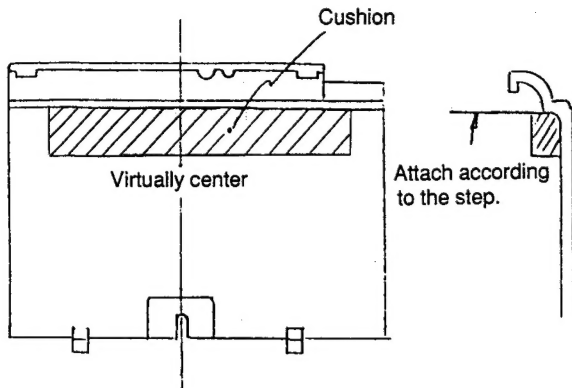
* The cushion must be attached securely. After the cushion glue is dried, it cannot be reattached. This part must be attached.

3. Coin screw insulation sheet attachment

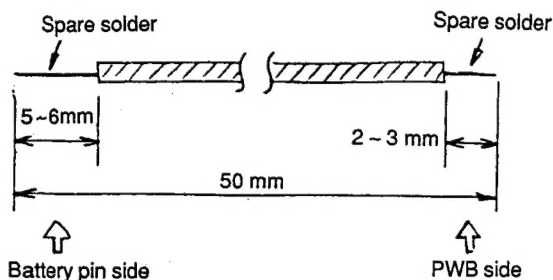


4. Battery cover

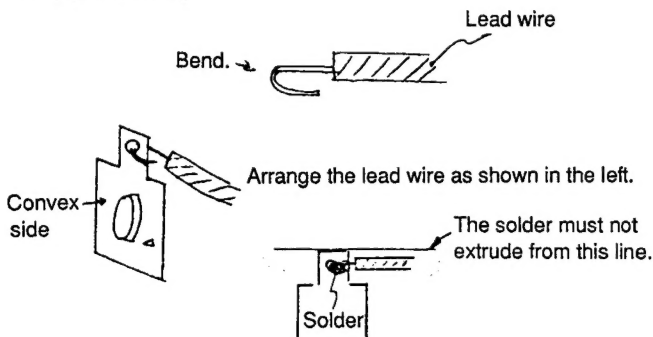
- Cushion attachment



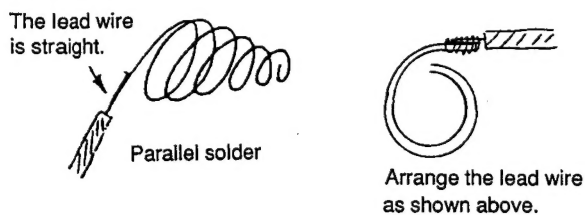
5. Battery pin



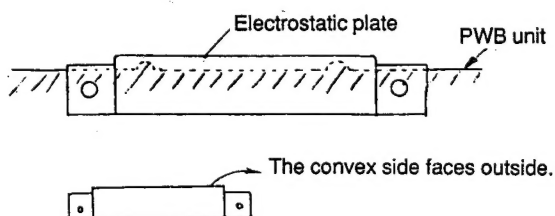
- ⊕ pin soldering



- ⊖ pin soldering

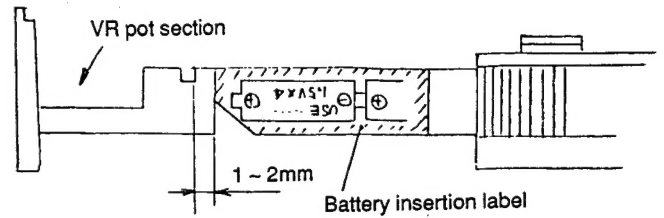


6. Electrostatic plate

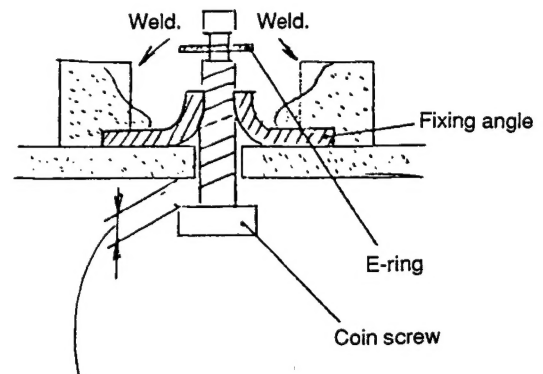


7. Cabinet bottom

- Battery insertion label attachment



- Coin screw section



When attaching the cabinet bottom unit to the cabinet upper unit, allow a clearance of 1~2mm between them. (Do not fix the coin screw tightly.)

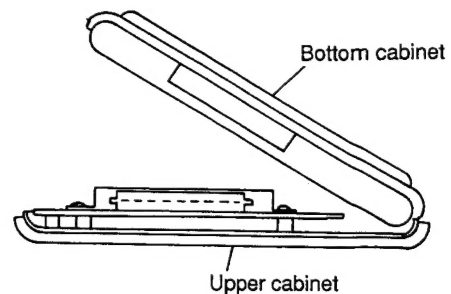
8. Battery current consumption

| | |
|-------------|----------------|
| OFF | 25.5μA or less |
| Displaying | 6.93mA or less |
| Calculating | 26.5mA or less |

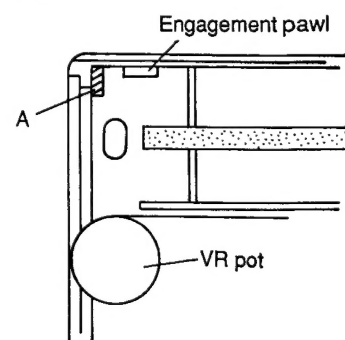
The values in the above table are those in normal temperature of 20°C. They will depend on the surrounding conditions.

9. Upper and lower cabinets engagement

- ① Fit the upper cabinet pawls with lower cabinet pawls. (4 positions)

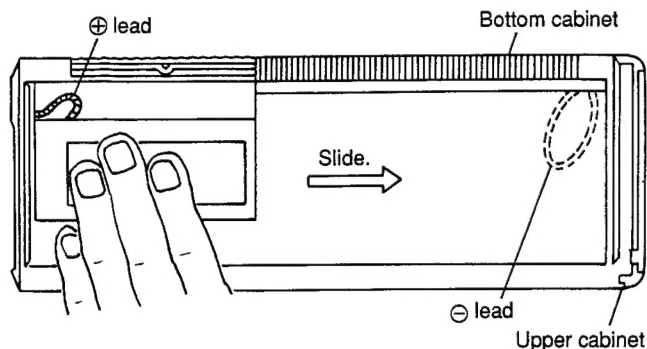


- ② With the pawls engaged (at 4 positions), slide the bottom cabinet to the VR pot side.

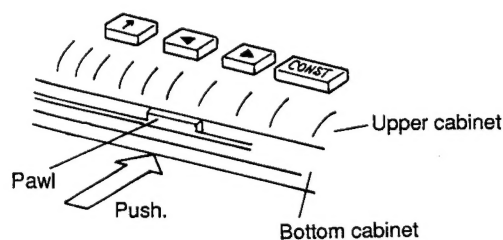


The bottom cabinet must be shifted until it makes contact with the upper cabinet rib (A).

- ③ Under the state of ②, lightly press the VR pot in the bottom cabinet. (At that time, the lead wires of ⊕ pin and ⊖ pin must be as shown below:

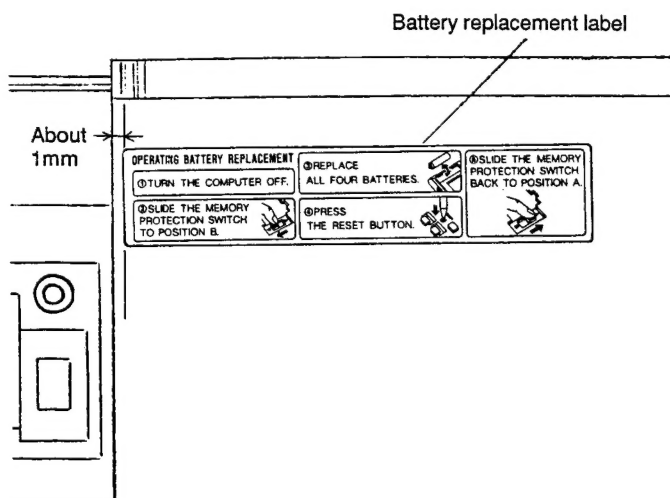


- ④ Slightly pressing with fingers, slide the bottom cabinet to the right as shown above.
- At that time, check that the VR pot is in the bottom cabinet hole.
 - Be careful not to make contact between the VR pot and the bottom cabinet as far as possible to prevent scratching.
- ⑤ Extend the 11 pin side of the bottom cabinet and attach the bottom cabinet.
- ⑥ Engage a pawl in your side with its corresponding hole.



Push the pawl section of the bottom cabinet to insert.

9. Battery replacement caution label attachment

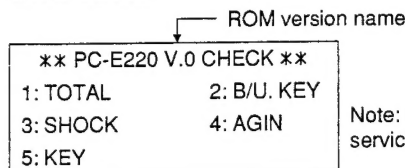


10. Diag.

Starting procedure

Turn on the power switch. While pressing the **[SHIFT]** key, press the **[]** key and press the reset switch.

Menu screen



1. Diag. check

Press **[1]** key. (Total)

A beep sounds once.

RAM check

ROM check

11 pin check (Refer to 2.)

[C] [0] [J]

RAM backup data write

Display check

Press the return key.

Display reversion check

Press the return key.

Press the RESET key.

OFF (Do not press **[Y]** key.)

Remove the battery according to the battery replacement procedure.

Insert the battery again.

Put the machine into the diag mode.

Press **[2]** key. (B/U key)

Press the return key.

RAM CHECKING
RAM CHECK OK
ROM CHECKING
ROM CHECK OK

I/O CHECKING
I/O ERROR
B/U DATA WRITING

BUSY カナ 2ndF G CONST E
RUN CASL STAT

CAPS 小 DE RAD M BATT
PRO TEXT PRINT

ON

RAM B/U DATA CHECKING
B/U DATA CHECK OK

ON

Key check
(Press the key which is displayed in the right under section of the screen.)

```
***** *
***** *
***** *
***** SFT
```

Press the Shift key.

KEY CHECK O.K.

Press the RESET key.

Press **[Y]** key.

End (Off)

- * In case of an error, press **[C]**, **[O]**, and **[J]** then go to the next step.
- * The data registered in the body are erased.

2. Pocket computer body 11 pin check

1) Tool UKOGC3020CSZZ, price rank "BC"

2) Check program (Input into the pocket computer.)

```
10 : FOR I = 0 TO 7
20 : OUT I
30 : PRINT I ; ">" ; " " ; INP ; " " ;
40 : NEXT
```

3) Connect the tool shown in 1) with 11 pin of the pocket computer.

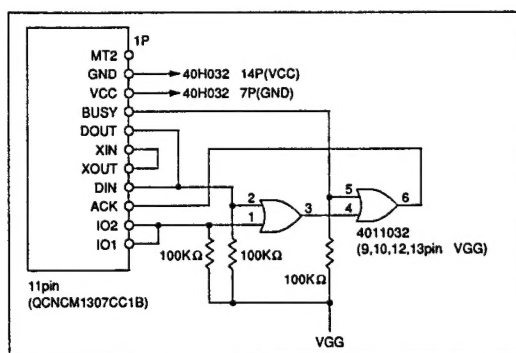
4) Execute the check program shown in 2)

5) If the result is as shown below, it is O.K.

```
0. => 0.      1. => 4.      2. => 3.
3. => 7.      4. => 1.      5. => 5.
6. => 3.      7. => 7.
```

OUT INP OUT INP OUT INP

6) Tool circuit diagram



7) Check code list

| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
|-----|--------|---|---|---|---|---|---|---|---|-------|
| OUT | H BUSY | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | ← OUT |
| | M DOUT | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | |
| | L XOUT | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | |
| INP | H XIN | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | ← IN |
| | M DIN | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | |
| | L ACK | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | | 0 | 4 | 3 | 7 | 1 | 5 | 3 | 7 | |

8) If the pocket computer check is O.K., go to the next step (CE-T801 check).

2. CE-T801 check

1. Operation check

1) Check program (Input this program into the pocket computer.)

```
100 : CLS : WAIT : E = 0
200 : FOR I = 0 TO 7
300 : OUT I : READ A
400 : IFA <> INP PRINT "ERROR" ; I ; ">" ;
      INP ; " " ; A ; " " : E = I
500 : NEXT
600 : IF E = 0 PRINT "OK!"
700 : DATA 0, 0, 0, 4, 0, 0, 1, 5
800 : OUT 0
900 : END
```

2) Short the CE-T801 25 pin connector by using the D-SUB male connector as shown below:

2. TXD(XIN) Short

3. RXD(XOUT) Short

4. RS (ACK) Short

5. CS (BUSY) Short

3) Connect the connector shorted by the CE-T801 with the pocket computer.

4) Execute the check program shown in 1).

5) If O.K. sign is displayed, the operation check is completed.

6) In case of an error

Display example:

ERROR 3. => 0. (4.)

Normal code
Error code
Check number

Check code table

| No. | Output | | | Input | | | Code |
|-----|--------|------|------|-------|-----|-----|------|
| | BUSY | DOUT | XOUT | XIN | DIN | ACK | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 1 | 1 | 1 | 0 | 0 | 4 |
| 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 6 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 0 | 1 | 5 |

3. Output voltage check

1) Check program (Input this program into the pocket computer.)

```
1000 : CLS : WAIT
1100 : OUT 3
1200 : PRINT "CHECK 3PIN : HIGH, 5PIN : LOW"
1300 : OUT 6
1400 : PRINT "CHECK 3PIN : LOW, 5PIN : HIGH"
1500 : OUT 0
1600 : END
```

2) Connect the CE-T801 with the pocket computer.

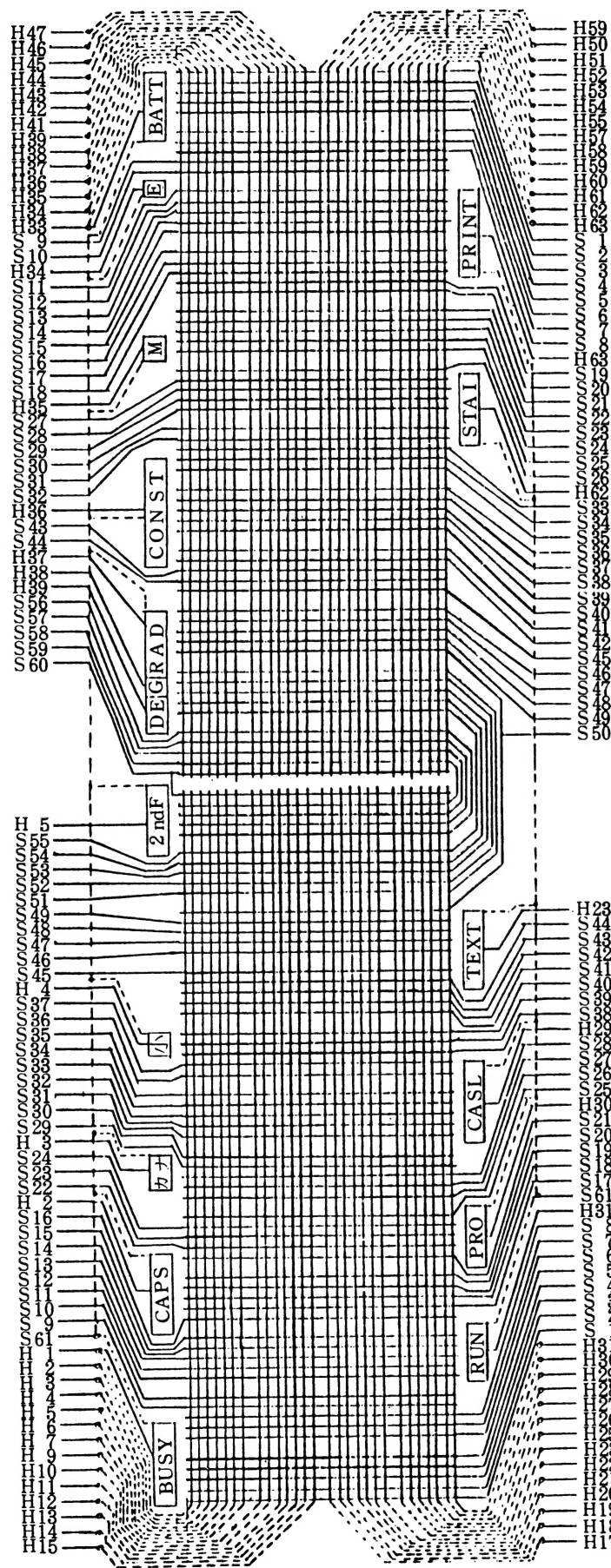
3) Execute the program shown in 1).

4) Check contents

| | Display | 3 pin (RXD) | 5 pin (CS) |
|----|--------------------------------|-------------|------------|
| 1. | CHECK 3PIN : HIGH : 5PIN : LOW | +3V ~ +15V | -3V ~ -15V |
| 2. | CHECK 3PIN : LOW, 5PIN : HIGH | -3V ~ -15V | +3V ~ +15V |

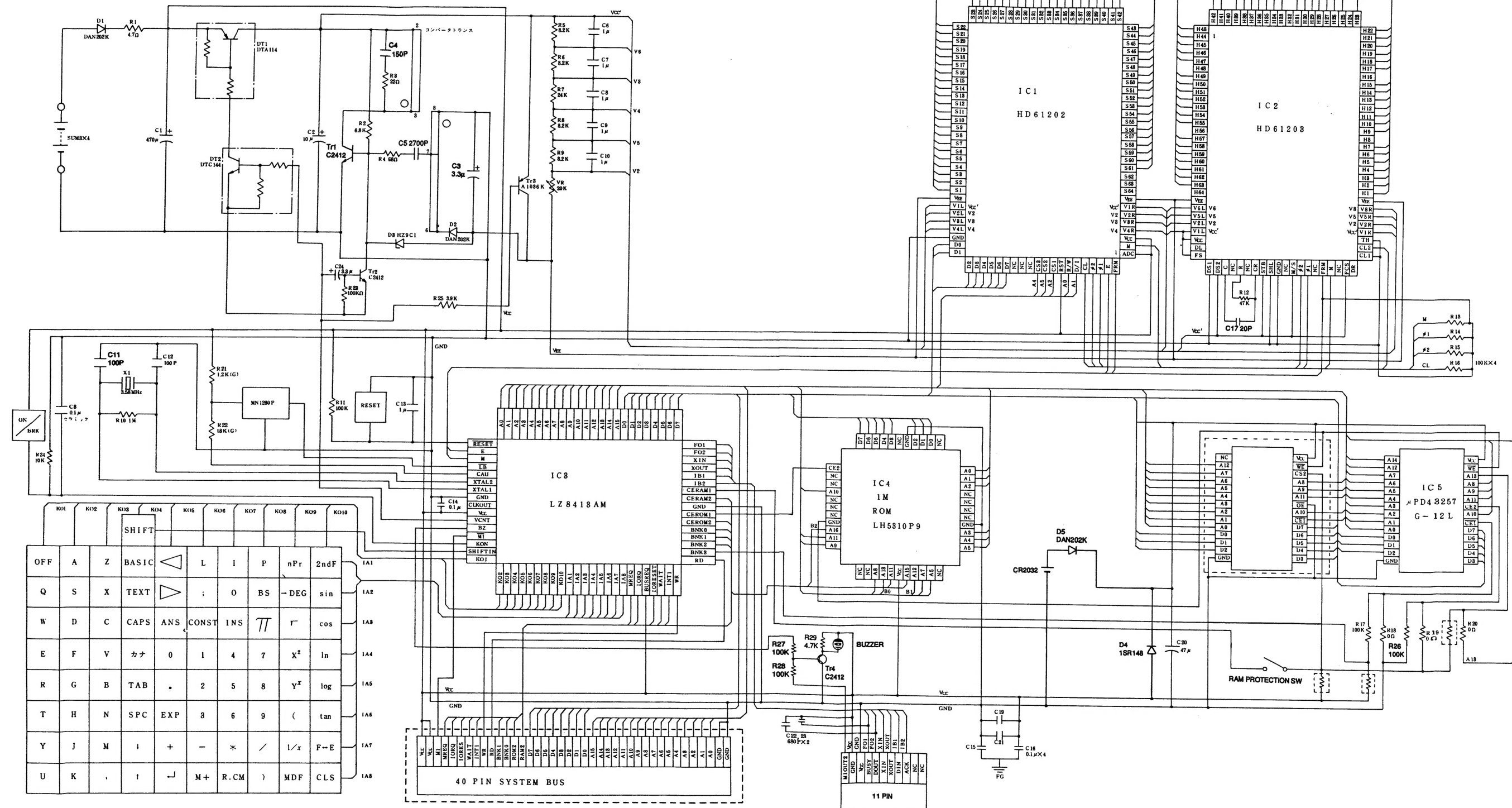
- With the above display, check the voltage at 3 pin and 5 pin with a voltmeter. (7 pin VGG, 3 pin and 5 pin voltages)
- After checking of 1), press the return key and execute the checking of 2).
- If the output voltage is 7 ~ 8V, it is O.K.

11. LCD connecting diagram

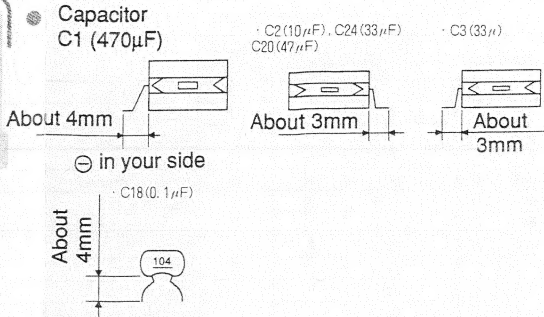
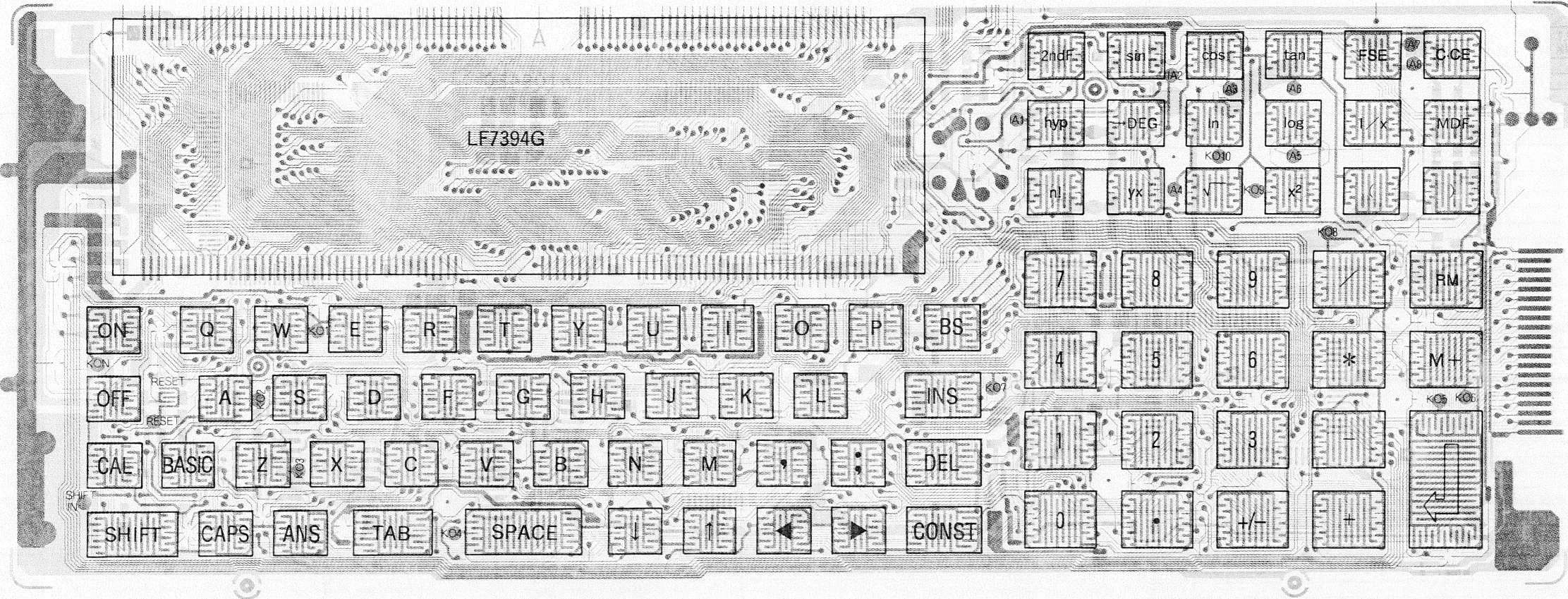


12. Circuit diagram

Note 1: For the dotted line section, refer to the pattern only.
 Note 2: C is 25WV 0.1μF capacitor, unless otherwise specified.
 Note 3: R is 1/8W J rank resistor unless otherwise specified.



13. Part signal arrangement



Note for rear attachment parts attachment

- C1 (470µF)
Solder and bond C1 to the PWB as shown in the parts arrangement pattern. C1 must be in close contact with the PWB.
- MN1280P

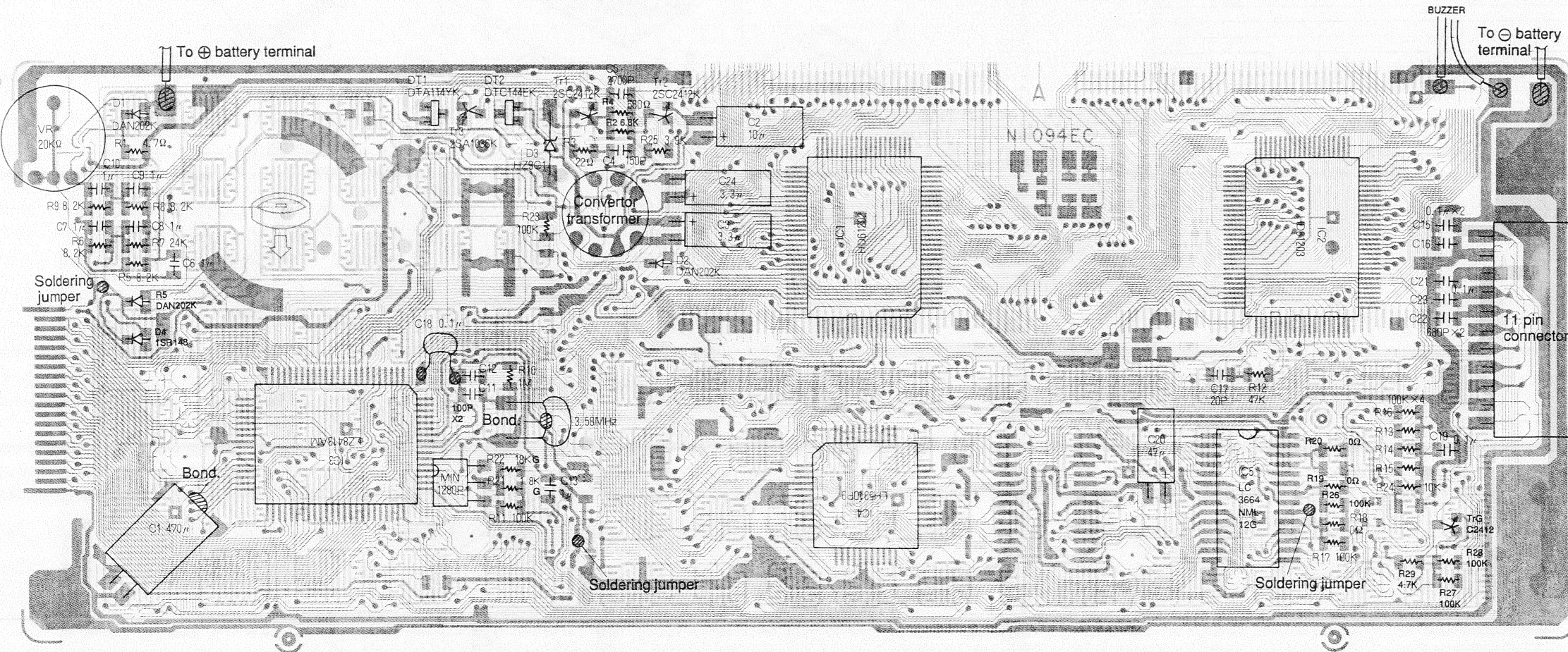
MAX. 5mm

When the MN1280 is attached, its molded section comes on the LZ8413M lead.
Solder it so that its height is max. 5mm as shown above.

For the other parts also, solder so that they make close contact with the PWB.

- Jumper wire

Treat the jumper wires so that they are not entangled.

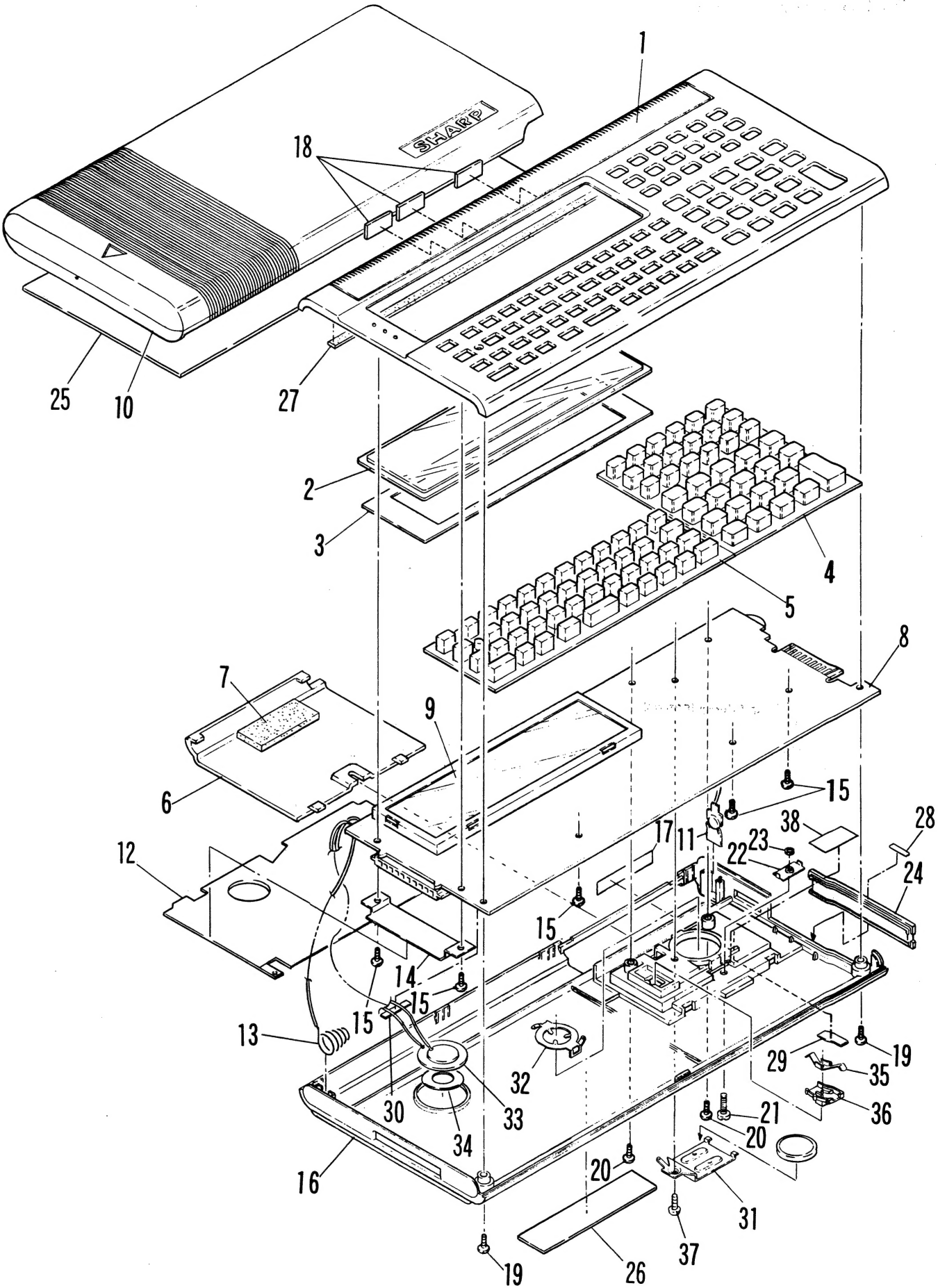




11. Parts list & guide

1 Exteriors

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|-----|---------------|------------|----------|-----------|----------------------------------|
| 1 | GCABB1041EC09 | AL | N | D | Top cabinet |
| 2 | PFI1W1010ECZZ | AD | | D | Acryl filter |
| 3 | PSLDP1024ECSB | AC | N | C | Display mask |
| 4 | PGUMM1024EC01 | AM | N | B | Key rubber A |
| 5 | PGUMM1026EC01 | AL | N | B | Key rubber B |
| 6 | GFTAB1014EC01 | AB | N | D | Battery lid |
| 7 | PCUSS1018ECZZ | AA | N | C | Cushion for battery fixing |
| 8 | DUNTK1461ECZZ | BS | N | E | Main PWB unit |
| 9 | DUNT-1434ECZZ | AV | N | E | LCD unit |
| 10 | GCASP1004EC03 | AF | N | D | Hard case |
| 11 | QTANZ1124CCZZ | AA | | C | Battery terminal ⊕ |
| 12 | PTPEH1050ECZZ | AQ | N | C | Shield tape |
| 13 | QTANZ1022ECZZ | AA | N | C | Battery terminal ⊖ |
| 14 | PSLDC1025ECZZ | AB | N | C | Electrostatic plate |
| 15 | LX-BZ1147CCZZ | AA | | C | Screw (2×4.5) |
| 16 | GCABA1040EC07 | AG | N | D | Bottom cabinet |
| 17 | TLABZ1273ECZZ | AA | N | D | Battery installation label |
| 18 | PCUSS1021ECZZ | AA | N | C | Battery fixing cushion |
| 19 | XUBSF20P10000 | AA | | C | Screw (2×10) |
| 20 | XUBSD20P10000 | AA | | C | Screw (2×10) |
| 21 | LX-BZ1021ECZZ | AB | N | C | Screw (Coin screw) |
| 22 | LANGT1216CC01 | AB | | C | Fixing angle |
| 23 | XRESP12-0300T | AA | N | C | E type ring |
| 24 | GFTAA1020ECZZ | AB | N | D | Connector lid |
| 25 | TLABZ1288ECZZ | AD | N | D | Operation label |
| 26 | TLABZ1286ECZZ | AC | N | C | Battery replacement label |
| 27 | PSPAZ1010ECZZ | AB | N | C | Battery spacer |
| 28 | PTPEH1437CCZZ | AA | | C | Duplex adhesive tape for crystal |
| 29 | TLABH1289ECZZ | AB | N | C | Battery indication label |
| 30 | PTPEH1045ECZZ | AA | N | C | Fixing tape (for lead wire) |
| 31 | QTANZ1504CCZZ | AB | | C | Battery terminal B |
| 32 | QTANZ1503CCZZ | AB | | C | Battery terminal A |
| 33 | RALMB1030CC01 | AD | | B | Buzzer |
| 34 | PTPEH1213CCZZ | AB | | C | Adhesive tape (for buzzer) |
| 35 | QCNTM1023CCZZ | AB | | C | Contact |
| 36 | JKNBZ1225CC02 | AA | | C | Slide switch knob |
| 37 | LX-BZ1023ECZZ | AA | | C | Screw |
| 38 | PTPEH1542CCZZ | AA | | C | SHEET |



2 PWB unit

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|-----|---------------|------------|----------|-----------|-------------------------------------------------------------|
| 1 | DUNT-1434ECZZ | AV | N | E | LCD unit |
| 2 | PGUMS1027ECZZ | AB | | B | Rubber connector |
| 3 | PSHEZ1463CCZZ | AA | | C | Wire fixing sheet |
| 4 | QCNCW1306CC1B | AK | | C | Connector (12pin) |
| 5 | RC-CZD105ECZZ | AC | | C | Capacitor (1 μ F) [C6~10,13] |
| 6 | RC-CZ1021CCZZ | AB | | C | Capacitor (0.1 μ F) [C14~16,19,21] |
| 7 | RC-KZ1054CCZZ | AB | | C | Capacitor (50WV 0.1 μ F) [C18] |
| 8 | RCRSZ1002ECZZ | AF | | B | Crystal (3.58MHZ) [X1] |
| 9 | RH-DZ1001ECZZ | AD | | B | Diode (1SR148) [D4] |
| 10 | RTRNH1003ECZZ | AE | N | B | Converter transformer |
| 11 | RVR-Z2400QCN1 | AF | | B | Variable resistor (20K Ω) [VR] |
| 12 | VCCCTQ1HH101J | AA | N | C | Capacitor (50WV 100PF) [C11,12] |
| 13 | VCCCTQ1HH151J | AA | N | C | Capacitor (50WV 150PF) [C4] |
| 14 | VCCCTQ1HH200J | AA | | C | Capacitor (50WV 20PF) [C17] |
| 15 | VCEAGU1AW476M | AA | | C | Capacitor (10WV 47 μ F) [C20] |
| 16 | VCEAGU1AW477M | AC | | C | Capacitor (10WV 470 μ F) [C1] |
| 17 | VCEAGU1CW106M | AA | | C | Capacitor (16WV 10 μ F) [C2] |
| 18 | VCEAGU1HW335M | AA | | C | Capacitor (50V 3.3 μ F) [C3,24] |
| 19 | VCKYPU1HB272K | AA | | C | Capacitor (50WV 2700pF) [C5] |
| 20 | VCKYTQ1HB681K | AA | N | C | Capacitor (50WV 680PF) [C22,23] |
| 21 | VHDDAN202K/-1 | AB | | B | Diode (DAN202K) [D1,2,5] |
| 22 | VHEHZ9C1///-1 | AB | | B | Zener diode (HZ9C1) [D3] |
| 23 | VHiD43257G12L | BB | | B | IC (D43257G12L) [IC5] |
| 24 | VHiHD61202/-1 | AS | | B | IC (HD61202) [IC1] |
| 25 | VHiHD61203/-1 | AX | | B | IC (HD61203) [IC2] |
| 26 | VHiLZ8413AM-1 | AV | N | B | IC (LZ8413AM) [IC3] |
| 27 | VHiMN1280P/-1 | AE | | B | IC (MN1280P) [IC4] |
| 28 | VHiLH5310PD-1 | AT | N | B | IC(LH5310PD) [IC4] |
| 29 | VRS-TP2BD000J | AA | | C | Resistor (1/8W 0 Ω \pm 5%) [R18~20] |
| 30 | VRS-TP2BD103J | AA | | C | Resistor (1/8W 10K Ω \pm 5%) [R24] |
| 31 | VRS-TP2BD104J | AA | | C | Resistor (1/8W 100K Ω \pm 5%) [R11,13~17,23,26~28] |
| 32 | VRS-TP2BD105J | AA | | C | Resistor (1/8W 1.0M Ω \pm 5%) [R10] |
| 33 | VRS-TP2BD182G | AA | N | C | Resistor (1/8W 1.8K Ω \pm 2%) [R21] |
| 34 | VRS-TP2BD183G | AA | | C | Resistor (1/8W 18K Ω \pm 2%) [R22] |
| 35 | VRS-TP2BD220J | AA | | C | Resistor (1/8W 22 Ω \pm 5%) [R3] |
| 36 | VRS-TP2BD243J | AA | | C | Resistor (1/8W 24K Ω \pm 5%) [R7] |
| 37 | VRS-TP2BD392J | AA | | C | Resistor (1/8W 3.9K Ω \pm 5%) [R25] |
| 38 | VRS-TP2BD4R7J | AA | | C | Resistor (1/8W 4.7 Ω \pm 5%) [R1] |
| 39 | VRS-TP2BD472J | AA | | C | Resistor (1/8W 4.7K Ω \pm 5%) [R29] |
| 40 | VRS-TP2BD473J | AA | | C | Resistor (1/8W 47K Ω \pm 5%) [R12] |
| 41 | VRS-TP2BD680J | AA | | C | Resistor (1/8W 68 Ω \pm 5%) [R4] |
| 42 | VRS-TP2BD682J | AA | | C | Resistor (1/8W 6.8K Ω \pm 5%) [R2] |
| 43 | VRS-TP2BD822J | AA | | C | Resistor (1/8W 8.2K Ω \pm 5%) [R5,6,8,9] |
| 44 | VSDTA114YK/-1 | AC | | B | Transistor (DTA114YK) [DT1] |
| 45 | VSDTC144EK/-1 | AC | | B | Transistor (DTC144EK) [DT2] |
| 46 | VS2SA1036KQRC | AB | | B | Transistor (2SA1036KQRC) [Tr3] |
| 47 | VS2SC2412K/-1 | AB | | B | Transistor (2SC2412K) [Tr1,2,4] |
| | (Unit) | | | | |
| 901 | DUNTK1461ECZZ | BS | N | E | Main PWB unit |

3 Packing material & Accessories

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|-----|---------------|------------|----------|-----------|-------------------------------------------|
| 1 | TINSE1203ECZZ | AT | N | E | Instruction book(E) (for U.S.A.) |
| | TINSF1205ECZZ | AT | N | D | Instruction book(F) (for Canada) |
| | TINSG1206ECZZ | AT | N | D | Instruction book(G) (for Germany) |
| | TINSE1204ECZZ | AT | N | D | Instruction book(E) (for other countries) |
| 2 | SPAKC0496ECZZ | AE | N | D | Packing case (for U.S.A.) |
| | SPAKC0499ECZZ | AE | N | D | Packing case (for Canada) |
| | SPAKC0500ECZZ | AE | N | D | Packing case (for other countries) |
| 3 | SPAKA0484ECZZ | AE | N | D | Packing cushion(tray) |
| 4 | SSAKA0006UCZZ | AA | | D | Vinyl bag (50 \times 60) |
| 5 | SSAKH0015HCZZ | AA | | D | Vinyl bag (180 \times 280) |
| 6 | PHOG-1003ECZZ | AA | N | D | Protection paper |
| | TLABM1290ECZZ | AC | N | D | Name plate label (for U.S.A.) |
| | TLABM1287ECZZ | AB | N | D | Name plate label (except for U.S.A.) |